

CLAIM AMENDMENTS

Claim 1 (currently amended): A torch lighter, comprising:

a casing having a liquefied fuel storage and a fuel valve which is actuated by a fuel lever pivotally mounted in said casing for releasing fuel therefrom;

an ignition unit generating sparks directed from a piezoelectric tip thereof toward an ignition chamber; and

a fuel nozzle assembly provided for vaporizing said fuel released from said fuel valve to a high-pressured gaseous fuel to emit to said ignition chamber, wherein said fuel nozzle assembly comprises:

a nozzle body having a root opening, an emitting opening, and at least an air inlet provided thereon, wherein said air inlet is positioned adjacent to said root opening to define an elongated mixing chamber axially extended between said air inlet to said emitting opening, wherein said mix chamber has a diameter sized between 1mm to 2.5 mm and a flow of air is capable of inletting into said mixing chamber through said air inlet;

a torch nozzle, which is coaxially connected between said root opening of said nozzle body and said fuel valve, having a micro nozzle pore having a diameter of 0.05mm to 0.12mm and comprising a mesh filter provided below said nozzle pore for preventing residual particles of said fuel from entering said nozzle body, wherein said fuel released from said fuel valve is vaporized into a strong, pressurized gaseous fuel jetting into said mix chamber, wherein said jetting gaseous fuel and said air flowing through mix chamber are mixed to form a mixture gas at said emitting opening of said nozzle body;

a combustion housing which is supported around said emitting opening of said nozzle body and defines said ignition chamber therein; and

a torch head, which is provided at said emitting opening of said nozzle body and supported within said combustion housing, having:

a root chamber,

~~two or more~~ at least two elongated nozzle ducts, each having an ignition end and a root end extended and opened into said root chamber, wherein said root ends of said two nozzle ducts are adjacently positioned to define a diversion joint edge therebetween while said two ignition ends of said two nozzle ducts are diverged and ~~extended within~~ communicated with said ignition chamber to define a torch gap therebetween, wherein a large main portion of said mixture gas at said emitting opening of said nozzle body bursts two or more ejecting beams of said mixture gas at said ignition ends of said nozzle ducts respectively, and

a torch stabilizing arrangement diverging a relatively small portion of said mixture gas at said emitting opening of said nozzle body to fill up said ignition chamber, wherein said sparks generated from said piezoelectric tip of said ignition unit first ignite said relatively small portion of said mixture gas filled in said ignition chamber to form a plurality of root flames which are united and mixed to form an environment root flame surrounding said torch head and said ignition ends of said nozzle ducts, wherein said environment root flame ignites said ejecting beams of said mixture gas burst from said ignition ends of said nozzle ducts to form two or more spaced torches while said environment root flame stabilizing and holding said spaced torches to form a strong and stable group of said torches.

Claim 2 (previously presented): The torch lighter, as recited in claim 1, wherein said root chamber forms a gas stabilizing reservoir to ensure a stable flow of said mixture gas and said root ends of said nozzle ducts are extended to a ceiling of said root chamber.

Claim 3 (original): The torch lighter, as recited in claim 2, wherein said nozzle body is a tubular throat conduit having a root end forming said root opening, an emitting end forming said emitting opening, wherein said air inlet is transversely formed on said root end and has a diameter slightly larger than said diameter of said mix chamber so as to provide a suction force to absorb said air into said mix chamber in such a manner that said mix chamber has a predetermined length and size arranged for said air and said gaseous fuel being evenly mixed to form said mixture gas at said emitting opening of said nozzle body.

Claim 4 (original): The torch lighter, as recited in claim 1, wherein said combustion housing is a ring shaped body having a surrounding wall defining said ignition chamber therein and said torch head is coaxially connected to said emitting opening of said nozzle body and supported within said combustion housing in such a manner that said ignition chamber is formed surrounding said torch head.

Claim 5 (original): The torch lighter, as recited in claim 3, wherein said combustion housing is a ring shaped body having a surrounding wall defining said ignition chamber therein and said torch head is coaxially connected to said emitting opening of said nozzle body and supported within said combustion housing in such a manner that said ignition chamber is formed surrounding said torch head.

Claim 6 (original): The torch lighter, as recited in claim 5, wherein a top end of said torch head is lower than a top end of said combustion housing and an outer diameter of said torch head is smaller than an inner diameter of said combustion housing, so that said ignition chamber is also formed above said torch head.

Claim 7 (previously presented): The torch lighter, as recited in claim 1, wherein said diversion joint edge between said roots ends of said nozzle ducts is 1.5mm or less.

Claim 8 (previously presented): The torch lighter, as recited in claim 2, wherein said diversion joint edge between said roots ends of said nozzle ducts is 1.5mm or less.

Claim 9 (previously presented): The torch lighter, as recited in claim 3, wherein said diversion joint edge between said roots ends of said nozzle ducts is 1.5mm or less.

Claim 10 (previously presented): The torch lighter, as recited in claim 6, wherein said diversion joint edge between said roots ends of said nozzle ducts is 1.5mm or less.

Claim 11 (currently amended): The torch lighter, as recited in claim 1, wherein said torch stabilizing arrangement has a plurality of diversion emitting openings formed around said torch head to communicate said root chamber with said ignition chamber,

wherein said diversion emitting openings are positioned adjacently below said roots ends of said nozzle ducts, wherein said main large portion of said mixture gas flown into said root chamber is ejected through said two nozzle ducts and said relatively small second portion of said mixture gas is diverged to emit through said diversion emitting openings and fill up said ignition chamber to be ignited to form said environment root flame surrounding said torch head and said root portions of said torches.

Claim 12 (currently amended): The torch lighter, as recited in claim 2, wherein said torch stabilizing arrangement has a plurality of diversion emitting openings formed around said torch head to communicate said root chamber with said ignition chamber, wherein diversion emitting openings are positioned adjacently below said roots ends of said nozzle ducts, wherein diversion emitting openings are positioned adjacently below said roots ends of said nozzle ducts, wherein said large main portion of said mixture gas flown into said root chamber is ejected through said two nozzle ducts and said relatively small portion of said mixture gas is diverged to emit through said diversion emitting openings and fill up said ignition chamber to be ignited to form said environment root flame surrounding said torch head and said root portions of said torches.

Claim 13 (currently amended): The torch lighter, as recited in claim 3, wherein said torch stabilizing arrangement has a plurality of diversion emitting openings formed around said torch head to communicate said root chamber with said ignition chamber, wherein diversion emitting openings are positioned adjacently below said roots ends of said nozzle ducts, wherein diversion emitting openings are positioned adjacently below said roots ends of said nozzle ducts, wherein said large main of said mixture gas flown into said root chamber is ejected through said two nozzle ducts and said relatively small portion of said mixture gas is diverged to emit through said diversion emitting openings and fill up said ignition chamber to be ignited to form said environment root flame surrounding said torch head and said root portions of said torches.

Claim 14 (currently amended): The torch lighter, as recited in claim 6, wherein said torch stabilizing arrangement has a plurality of diversion emitting openings formed around said torch head to communicate said root chamber with said ignition chamber, wherein diversion emitting openings are positioned adjacently below said roots ends of said nozzle ducts, wherein a conical ceiling surface is formed extending between said root ends of said nozzle ducts and said diversion emitting openings and said diversion emitting openings are evenly spaced apart, wherein diversion emitting openings are

positioned adjacently below said roots ends of said nozzle ducts, thereby wherein said large main of said mixture gas flown into said root chamber is ejected through said two nozzle ducts and said relatively small portion of said mixture gas is diverged to emit through said diversion emitting openings and fill up said ignition chamber to be ignited to form said environment root flame surrounding said torch head and said root portions of said torches.

Claim 15 (currently amended): The torch lighter, as recited in claim 9, wherein said torch stabilizing arrangement has a plurality of diversion emitting openings formed around said torch head to communicate said root chamber with said ignition chamber, wherein diversion emitting openings are positioned adjacently below said roots ends of said nozzle ducts, wherein said large main of said mixture gas flown into said root chamber is ejected through said two nozzle ducts and said relatively small portion of said mixture gas is diverged to emit through said diversion emitting openings and fill up said ignition chamber to be ignited to form said environment root flame surrounding said torch head and said root portions of said torches.

Claim 16 (currently amended): The torch lighter, as recited in claim 10, wherein said torch stabilizing arrangement has a plurality of diversion emitting openings formed around said torch head to communicate said root chamber with said ignition chamber, wherein diversion emitting openings are positioned adjacently below said roots ends of said nozzle ducts, wherein said large main of said mixture gas flown into said root chamber is ejected through said two nozzle ducts and said relatively small portion of said mixture gas is diverged to emit through said diversion emitting openings and fill up said ignition chamber to be ignited to form said environment root flame surrounding said torch head and said root portions of said torches.

Claim 17 (withdrawn): The torch lighter, as recited in claim 11, wherein each of said diversion emitting openings is a through hole formed on said torch head.

Claim 18 (withdrawn): The torch lighter, as recited in claim 12, wherein each of said diversion emitting openings is a through hole formed on said torch head.

Claim 19 (withdrawn): The torch lighter, as recited in claim 15, wherein each of said diversion emitting openings is a through hole formed on said torch head.

Claim 20 (withdrawn): The torch lighter, as recited in claim 16, wherein each of said diversion emitting openings is a through hole formed on said torch head.

Claim 21 (original): The torch lighter, as recited in claim 11, wherein each of said diversion emitting openings is a longitudinal slot at least evenly spacedly formed around said root chamber of said torch head.

Claim 22 (original): The torch lighter, as recited in claim 12, wherein each of said diversion emitting openings is a longitudinal slot at least evenly spacedly formed around said root chamber of said torch head.

Claim 23 (original): The torch lighter, as recited in claim 15, wherein each of said diversion emitting openings is a longitudinal slot at least evenly spacedly formed around said root chamber of said torch head.

Claim 24 (original): The torch lighter, as recited in claim 16, wherein each of said diversion emitting openings is a longitudinal slot at least evenly spacedly formed around said root chamber of said torch head.

Claim 25 (withdrawn): The torch lighter, as recited in claim 1, wherein each of said nozzle ducts is upwardly extended to have an upper portion above said torch head and said torch stabilizing arrangement has a plurality of diversion emitting openings formed at said upper portions of said nozzle ducts, wherein said emitting end of each of said nozzle ducts is narrower and a rest of said nozzle duct such that said environment root flame is formed around a root of said respective torch for stabilizing and holding firm to said torches produced at said emitting ends of said nozzle ducts.

Claim 26 (withdrawn): The torch lighter, as recited in claim 2, wherein each of said nozzle ducts is upwardly extended to have an upper portion above said torch head and said torch stabilizing arrangement has a plurality of diversion emitting openings formed at said upper portions of said nozzle ducts, wherein said emitting end of each of said nozzle ducts is narrower and a rest of said nozzle duct such that said environment root flame is formed around a root of said respective torch for stabilizing and holding firm to said torches produced at said emitting ends of said nozzle ducts.

Claim 27 (withdrawn): The torch lighter, as recited in claim 3, wherein each of said nozzle ducts is upwardly extended to have an upper portion above said torch head and said torch stabilizing arrangement has a plurality of diversion emitting openings formed at said upper portions of said nozzle ducts, wherein said emitting end of each of said nozzle ducts is narrower and a rest of said nozzle duct such that said environment root flame is formed around a root of said respective torch for stabilizing and holding firm to said torches produced at said emitting ends of said nozzle ducts.

Claim 28 (withdrawn): The torch lighter, as recited in claim 6, wherein each of said nozzle ducts is upwardly extended to have an upper portion above said torch head and said torch stabilizing arrangement has a plurality of diversion emitting openings formed at said upper portions of said nozzle ducts, wherein said emitting end of each of said nozzle ducts is narrower and a rest of said nozzle duct such that said environment root flame is formed around a root of said respective torch for stabilizing and holding firm to said torches produced at said emitting ends of said nozzle ducts.

Claim 29 (withdrawn): The torch lighter, as recited in claim 9, wherein each of said nozzle ducts is upwardly extended to have an upper portion above said torch head and said torch stabilizing arrangement has a plurality of diversion emitting openings formed at said upper portions of said nozzle ducts, wherein said emitting end of each of said nozzle ducts is narrower and a rest of said nozzle duct such that said environment root flame is formed around a root of said respective torch for stabilizing and holding firm to said torches produced at said emitting ends of said nozzle ducts.

Claim 30 (withdrawn): The torch lighter, as recited in claim 10, wherein each of said nozzle ducts is upwardly extended to have an upper portion above said torch head and said torch stabilizing arrangement has a plurality of diversion emitting openings formed at said upper portions of said nozzle ducts, wherein said emitting end of each of said nozzle ducts is narrower and a rest of said nozzle duct such that said environment root flame is formed around a root of said respective torch for stabilizing and holding firm to said torches produced at said emitting ends of said nozzle ducts.

Claim 31 (withdrawn): The torch lighter, as recited in claim 25, wherein said upper portions of said nozzle ducts are vertical extended upwardly in a parallel manner.

Claim 32 (withdrawn): The torch lighter, as recited in claim 26, wherein said upper portions of said nozzle ducts are vertical extended upwardly in a parallel manner.

Claim 33 (withdrawn): The torch lighter, as recited in claim 29, wherein said upper portions of said nozzle ducts are vertical extended upwardly in a parallel manner.

Claim 34 (withdrawn): The torch lighter, as recited in claim 30, wherein said upper portions of said nozzle ducts are vertical extended upwardly in a parallel manner.

Claim 35 (original): The torch lighter, as recited in claim 1, wherein said diameter of said nozzle pore is 0.08mm.

Claim 36 (original): The torch lighter, as recited in claim 10, wherein said diameter of said nozzle pore is 0.08mm.

Claim 37 (original): The torch lighter, as recited in claim 16, wherein said diameter of said nozzle pore is 0.08mm.

Claim 38 (withdrawn): The torch lighter, as recited in claim 30, wherein said diameter of said nozzle pore is 0.08mm.

Claim 39 (previously presented): The torch lighter, as recited in claim 11, wherein said torch head is structured as a gear, wherein said diversion emitting openings of said torch head are longitudinal slots spacedly formed around said torch head, wherein a bottom portion of said diversion emitting openings are actually a layer of space defined by a top surface of said fuel ignition assembly and a bottom surface of said torch head, whereby said layer of space functions as multiple diversion emitting openings extending from said root ends of said nozzle ducts.

Claim 40 (previously presented): The torch lighter, as recited in claim 12, wherein said torch head is structured as a gear, wherein said diversion emitting openings of said torch head are longitudinal slots spacedly formed around said torch head, wherein a bottom portion of said diversion emitting openings are actually a layer of space defined by a top surface of said fuel ignition assembly and a bottom surface of said torch head, whereby said layer of space functions as multiple diversion emitting openings extending from said root ends of said nozzle ducts.

Claim 41 (previously presented): The torch lighter, as recited in claim 13, wherein said torch head is structured as a gear, wherein said diversion emitting openings of said torch head are longitudinal slots spacedly formed around said torch head, wherein a bottom portion of said diversion emitting openings are actually a layer of space defined by a top surface of said fuel ignition assembly and a bottom surface of said torch head, whereby said layer of space functions as multiple diversion emitting openings extending from said root ends of said nozzle ducts.

Claim 42 (previously presented): The torch lighter, as recited in claim 14, wherein said torch head is structured as a gear, wherein said diversion emitting openings of said torch head are longitudinal slots spacedly formed around said torch head, wherein a bottom portion of said diversion emitting openings are actually a layer of space defined by a top surface of said fuel ignition assembly and a bottom surface of said torch head, whereby said layer of space functions as multiple diversion emitting openings extending from said root ends of said nozzle ducts.

Claim 43 (previously presented): The torch lighter, as recited in claim 15, wherein said torch head is structured as a gear, wherein said diversion emitting openings of said torch head are longitudinal slots spacedly formed around said torch head, wherein a bottom portion of said diversion emitting openings are actually a layer of space defined by a top surface of said fuel ignition assembly and a bottom surface of said torch head, whereby said layer of space functions as multiple diversion emitting openings extending from said root ends of said nozzle ducts.

Claim 44 (previously presented): The torch lighter, as recited in claim 16, wherein said torch head is structured as a gear, wherein said diversion emitting openings of said torch head are longitudinal slots spacedly formed around said torch head, wherein a bottom portion of said diversion emitting openings are actually a layer of space defined by a top surface of said fuel ignition assembly and a bottom surface of said torch head, whereby said layer of space functions as multiple diversion emitting openings extending from said root ends of said nozzle ducts.

Claim 45 (withdrawn): A torch lighter, comprising:

a casing having a liquefied fuel storage and a fuel valve which is actuated by a fuel lever pivotally mounted in said casing for releasing fuel therefrom;

an ignition unit generating sparks directed toward an ignition chamber; and

a fuel nozzle assembly provided for vaporizing said fuel released from said fuel valve to a high-pressured gaseous fuel to emit to said ignition chamber, wherein said fuel nozzle assembly comprises:

a nozzle body having a root opening, an emitting opening, and at least an air inlet provided thereon, wherein said air inlet is positioned adjacent to said root opening to define an elongated mixing chamber axially extended between said air inlet to said emitting opening, wherein said mix chamber has a diameter sized between 1mm to 2.5mm and a flow of air is capable of inletting into said mixing chamber through said air inlet;

a torch nozzle, which is coaxially connected between said root opening of said nozzle body and said fuel valve, having a micro nozzle pore having a diameter of 0.05mm to 0.12mm and comprising a mesh filter provided below said nozzle pore for preventing residual particles of said fuel from entering said nozzle body, wherein said fuel released from said fuel valve is vaporized into a strong, pressurized gaseous fuel jetting into said mix chamber, wherein said jetting gaseous fuel and said air flowing through mix chamber are mixed to form a mixture gas at said emitting opening of said nozzle body;

a combustion housing which is supported around said emitting opening of said nozzle body and defines said ignition chamber therein; and

a torch head, which is provided at said emitting opening of said nozzle body and supported within said combustion housing, having:

a root chamber,

two elongated slanted side nozzle duct and an elongated vertical central nozzle duct provided between said two side nozzle ducts to define a predetermined angle between each of said side nozzle ducts and said central nozzle, wherein each of said two side nozzle ducts and said central nozzle has an ignition end and a root end extended and opened into said root chamber, wherein said root end of said central nozzle duct is positioned adjacent to said two side nozzle ducts to define two diversion

joint edges between said central nozzle duct and said two side nozzle ducts respectively, while said ignition end of said central duct is upwardly and vertically extended inside said ignition chamber and said two ignition ends of said two side nozzle ducts are diverged and extended inside said ignition chamber, so as to define two torch gaps between said central nozzle duct and said two side nozzle ducts, and

a torch stabilizing arrangement providing a plurality of root flames which are united and mixed with root portions of said torches to form a stable environment root flame for igniting said mixture gas ejected from said ignition ends of said nozzle ducts to form two or more spaced torches and stabilizing and holding said spaced torches to form a strong and stable group of said torches.

Claim 46 (withdrawn): The torch lighter, as recited in claim 45, wherein three ignition ends of said central nozzle duct and said two side nozzle ducts are aligned in line.

Claim 47 (withdrawn): The torch lighter, as recited in claim 45, wherein two diversion joint edges each of which is made as thin as 1.5 mm or less.

Claim 48 (withdrawn): The torch lighter, as recited in claim 46, wherein two diversion joint edges each of which is made as thin as 1.5 mm or less.

Claim 49 (withdrawn): The torch lighter, as recited in claim 45, wherein said root chamber forms a gas stabilizing reservoir to ensure a stable flow of said mixture gas and said root ends of said nozzle ducts are extended to a ceiling of said root chamber.

Claim 50 (withdrawn): The torch lighter, as recited in claim 46, wherein said root chamber forms a gas stabilizing reservoir to ensure a stable flow of said mixture gas and said root ends of said nozzle ducts are extended to a ceiling of said root chamber.

Claim 51 (withdrawn): The torch lighter, as recited claim 49, wherein said nozzle body is a tubular throat conduit having a root end forming said root opening, an emitting end forming said emitting opening, wherein said air inlet is transversely formed on said root end and has a diameter slightly larger than said diameter of said mix

chamber so as to provide a suction force to absorb said air into said mix chamber in such a manner that said mix chamber has a predetermined length and size arranged for said air and said gaseous fuel being evenly mixed to form said mixture gas at said emitting opening of said nozzle body.

Claim 52 (withdrawn): The torch lighter, as recited in claim 51, wherein said combustion housing is a ring shaped body having a surrounding wall defining said ignition chamber therein and said torch head is coaxially connected to said emitting opening of said nozzle body and supported within said combustion housing in such a manner that said ignition chamber is formed surrounding said torch head.

Claim 53 (withdrawn): The torch lighter, as recited in claim 52, wherein a top end of said torch head is lower than a top end of said combustion housing and an outer diameter of said torch head is smaller than an inner diameter of said combustion housing, so that said ignition chamber is also formed above said torch head.

Claim 54 (withdrawn): The torch lighter, as recited in claim 45, wherein said torch stabilizing arrangement has a plurality of diversion emitting openings formed around said torch head to communicate said root chamber with said ignition chamber, wherein diversion emitting openings are positioned adjacently below said roots ends of said central and side nozzle ducts, thereby a main portion of said mixture gas flown into said root chamber is ejected through said two side nozzle ducts and said central nozzle duct and a relatively small portion of said mixture gas is diverged to emit through said diversion emitting openings and fill up said ignition chamber to be ignited to form said environment root flame surrounding said torch head and said root portions of said torches.

Claim 55 (withdrawn): The torch lighter, as recited in claim 53, wherein said torch stabilizing arrangement has a plurality of diversion emitting openings formed around said torch head to communicate said root chamber with said ignition chamber, wherein diversion emitting openings are positioned adjacently below said roots ends of said central and side nozzle ducts, thereby a main portion of said mixture gas flown into said root chamber is ejected through said two side nozzle ducts and said central nozzle duct and a relatively small portion of said mixture gas is diverged to emit through said diversion emitting openings and fill up said ignition chamber to be ignited to form said

environment root flame surrounding said torch head and said root portions of said torches.

Claim 56 (withdrawn): The torch lighter, as recited in claim 54, wherein each of said diversion emitting openings is a through hole formed on said torch head.

Claim 57 (withdrawn): The torch lighter, as recited in claim 55, wherein each of said diversion emitting openings is a through hole formed on said torch head.

Claim 58 (withdrawn): The torch lighter, as recited in claim 45, wherein each of said central nozzle duct and said side nozzle ducts is upwardly extended to have an upper portion above said torch head and said torch stabilizing arrangement has a plurality of diversion emitting openings formed at said upper portions of said central nozzle duct and said side nozzle ducts, wherein said emitting end of each of said central nozzle duct and said side nozzle ducts is narrower and a rest thereof such that said environment root flame is formed around a root of said respective torch for stabilizing and holding firm to said torches produced at said emitting ends of said central nozzle duct and said side nozzle ducts.

Claim 59 (withdrawn): The torch lighter, as recited in claim 49, wherein each of said central nozzle duct and said side nozzle ducts is upwardly extended to have an upper portion above said torch head and said torch stabilizing arrangement has a plurality of diversion emitting openings formed at said upper portions of said central nozzle duct and said side nozzle ducts, wherein said emitting end of each of said central nozzle duct and said side nozzle ducts is narrower and a rest thereof such that said environment root flame is formed around a root of said respective torch for stabilizing and holding firm to said torches produced at said emitting ends of said central nozzle duct and said side nozzle ducts.

Claim 60 (withdrawn): The torch lighter, as recited in claim 45, wherein said diameter of said nozzle pore is 0.08mm.

Claim 61 (withdrawn): The torch lighter, as recited in claim 49, wherein said diameter of said nozzle pore is 0.08mm.

Claim 62 (withdrawn): The torch lighter, as recited in claim 45, wherein said torch head is structured as a gear, wherein said diversion emitting openings of said torch head are longitudinal slots spacedly formed around said torch head, wherein a bottom portion of said diversion emitting openings are actually a layer of space defined by a top surface of said fuel ignition assembly and a bottom surface of said torch head, whereby said layer of space functions as multiple diversion emitting openings extending from said root ends of said central nozzle duct and said side nozzle ducts.

Claim 63 (withdrawn): The torch lighter, as recited in claim 49, wherein said torch head is structured as a gear, wherein said diversion emitting openings of said torch head are longitudinal slots spacedly formed around said torch head, wherein a bottom portion of said diversion emitting openings are actually a layer of space defined by a top surface of said fuel ignition assembly and a bottom surface of said torch head, whereby said layer of space functions as multiple diversion emitting openings extending from said root ends of said central nozzle duct and said side nozzle ducts.